



AN ISO 9001 : 2008 COMPANY &NABL ACCREDITED LABORATORY AS PER ISO/IEC 17025:2005

# 4, 7TH MAIN MALLESWARAM, BANGALORE -3

Certificate No.: TC-5548

### QC ABSTRACT

**NAME OF WORK:** Improvements to Roads and Drains at Doddachanappa Layout, Raghuram layout, Kuvempunagara 1st Stage, Valmikinagara in Ward No.11 Kuvempunagara.

| SL NO            | Item Of Work                      | Name of Test                            | Frequency of Test/Quantity | Executed Quantity | Number of Tests Required | Number of Tests Conducted |
|------------------|-----------------------------------|-----------------------------------------|----------------------------|-------------------|--------------------------|---------------------------|
| <b>Materials</b> |                                   |                                         |                            |                   |                          |                           |
| 1                | Cement                            | Fineness by dry sieving                 | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Finess by Air permeability method       | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Density                                 | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Standard Consistency                    | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Initial Setting time                    | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Final Setting time                      | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Soundness (Le Chatelier's Method)       | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Compressive Strength                    | One Test                   |                   | 1                        | 1                         |
| 2                | Coarse aggregate(40 mm down size) | SIEVE ANALYSIS                          | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Flakiness Index                         | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Elongation Index                        | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Specific Gravity                        | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Bulk Density(Loose)                     | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Bulk Density(Compacted)                 | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Water Absorption                        | One Test                   |                   | 1                        | 1                         |
| 3                | Coarse aggregate(20 mm down size) | SIEVE ANALYSIS                          | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Flakiness Index                         | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Elongation Index                        | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Specific Gravity                        | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Bulk Density(Loose)                     | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Bulk Density(Compacted)                 | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Water Absorption                        | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Aggregate crushing Value                | One Test                   |                   | 1                        | 1                         |
| 4                | Fine aggregate                    | Aggregate Impact Value                  | One Test                   |                   | 1                        | 1                         |
|                  |                                   | SIEVE ANALYSIS                          | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Water Absorption                        | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Specific Gravity                        | One Test                   |                   | 1                        | 1                         |
| 5                | Block(400*150*200)                | Material finer than 75 micron           | One Test                   |                   | 1                        | 1                         |
|                  |                                   | BLOCK DENSITY                           | One Test                   |                   | 1                        | 1                         |
|                  |                                   | WATER ABSORPTION                        | One Test                   |                   | 1                        | 1                         |
|                  |                                   | DIMENSION ANALYSIS                      | One Test                   |                   | 1                        | 1                         |
| 6                | Precast (100mm)                   | COMPRESSIVE STRENGTH                    | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Core Compressive Strength               | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Corrected Cylinder Compressive Strength | One Test                   |                   | 1                        | 1                         |
| 7                | PCC(M20)                          | Equivalent Cube Compressive Strength    | One Test                   |                   | 1                        | 1                         |
|                  |                                   | Compressive Strength(7days and 28days)  | 5 set /100-150 cum         | 75.31             | 10                       | 10                        |
| 8                | Cement Concrete Pavemet (M30)     | Compressive Strength(7days and 28days)  | 12 set /31-100 cum         | 415.97            | 24                       | 24                        |

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HIGHWAY & BUILDING MATERIALS TESTING LABORATORY | STRUCTURAL |

GEO TECHNICAL | PROJECT MANAGEMENT | SURVEYING SERVICES |



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# 4, 7TH MAIN MALLESWARAM, BANGALORE -3

Certificate No.: TC-5548

Format No: CP/TF/01

**TEST REPORT OF PHYSICAL PROPERTIES OF CEMENT - 53 Grade**

**Lab ID** : CP-2020-03-03-01 **Date:** 05-02-20

**Project Name** : Improvements to Roads and Drains at Doddachanappa Layout,  
Raghuram layout, Kuvempunagara 1st Stage, Valmikinagara in Ward  
No.11 Kuvempunagara.

**Agency** : Executive Engineer, Karnataka Rural Infrastructure Development Ltd,  
#280, 59th Cross Road, 17th 'C' Main Road, 3rd 'Y' Block, Rajajinagara,  
Bangalore-560010

**Customer's Reference** : BBMP/EE/BTP/WO/194/2019-20

**Date of Receipt** : 02-02-20

**Sample Type** : Birla Super 53grade

**Reference to BIS codes** : IS 12269 : 2013, 53 Grade Ordinary Portland cement Specification ,  
IS 4031 (Part 1,2 3,4,5, 6,11):1988  
IS 4031 Part 1 DETERMINATION OF FINENESS BY DRY SIEVING, Clause 4.4  
IS 4031 Part 2, Determination of Fineness by Blaine Air Permeability Method, Clause 5  
IS 4031 Part 3, Determination of Soundness, Clause 5, Clause 6  
IS 4031 Part 4, Determination of Consistency of Standard Cement Paste, Clause 5  
IS 4031 Part 5, Determination of Initial & Final Setting Time, Clause 5  
IS 4031 Part 11, DETERMINATION OF DENSITY , Clause 6

**Date of test** : 03-02-20

**Environmental Conditions during test** : Temperature: 26°C  
Humidity: 72%

| Sl.No. | Physical properties                                           | Results     | Requirement as per IS 12269: 2013 |
|--------|---------------------------------------------------------------|-------------|-----------------------------------|
| 1      | Fineness by dry sieving (%)                                   | 1.76        | —                                 |
| 2      | Fineness by Air permeability method (m <sup>2</sup> /kg, Min) | 292.2       | 225m <sup>2</sup> /kg, Min        |
| 3      | Density (gm/cc)                                               | 3.12        | —                                 |
| 4      | Standard Consistency (%)                                      | 28.5%       | Not specified                     |
| 5      | Initial Setting time                                          | 145 minutes | Not less than 30 minutes          |
| 6      | Final Setting time                                            | 280 minutes | Not more than 600 minutes         |
| 7      | Soundness (Le Chatelier's Method)                             | 1.5mm       | Not more than 10 mm               |

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Page 1/1

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# 4, 7TH MAIN MALLESWARAM, BANGALORE -3

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**TEST REPORT OF PHYSICAL PROPERTIES OF CEMENT - 53 Grade**

**Lab ID** : CP-2020-03-03-01 **Date:** 02-03-20

**Project Name** : Improvements to Roads and Drains at Doddachanappa Layout, Raghuram layout, Kuvempunagara 1st Stage, Valmikinagara in Ward No.11 Kuvempunagara.

**Agency** : Executive Engineer, Karnataka Rural Infrastructure Development Ltd, #280, 59th Cross Road, 17th 'C' Main Road, 3rd 'Y' Block, Rajajinagara, Bangalore-560010

**Customer's Reference** : BBMP/EE/BTP/WO/194/2019-20

**Source of Sample** : Sample supplied by Agency

**Sample Condition** : Satisfactory

**Date of Receipt** : 02-02-20

**Sample Type** : Birla Super 53grade

**Reference to BIS codes** : IS 12269 : 2013, 53 Grade Ordinary Portland cement Specification ,  
IS 4031 Part 4, Determination of Consistency of Standard Cement Paste, Clause 5  
IS 4031 Part 6, Determination of Compressive Strength, Clause 6

**Date of test** : 03-02-20

**Environmental Conditions during test** : Temperature: 26°C  
Humidity: 72%

| Compressive Strength |                     |                       |                                    |
|----------------------|---------------------|-----------------------|------------------------------------|
| Sl.No.               | Physical properties | Results               | Requirement as per IS 12269: 2013  |
| 1                    | 3 Days              | 28.5N/mm <sup>2</sup> | Not less than 27 N/mm <sup>2</sup> |
| 2                    | 7 Days              | 39.0N/mm <sup>2</sup> | Not less than 37 N/mm <sup>2</sup> |
| 3                    | 28 Days             | 58.5N/mm <sup>2</sup> | Not less than 53 N/mm <sup>2</sup> |

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Page 1/1  
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Certificate No.: TC-5548

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### TEST REPORT ON COARSE AGGREGATES

**Lab ID** : CP-2020-03-03-01 **Date:** 05-02-20  
**Project Name** : Improvements to Roads and Drains at Doddachanappa Layout, Raghuram layout, Kuvempunagara 1st Stage, Valmikinagara in Ward No.11 Kuvempunagara.  
**Agency** : Executive Engineer, Karnataka Rural Infrastructure Development Ltd, #280, 59th Cross Road, 17th 'C' Main Road, 3rd 'Y' Block, Rajajinagara, Bangalore-560010  
**Customer's Reference** : BBMP/EE/BTP/WO/194/2019-20  
**Date of Receipt** : 02-02-20  
**Sample Type** : 40mm down size coarse aggregate  
**Reference to BIS codes** : IS: 383:2016 (Specification for Coarse and fine Aggregates )  
IS: 2386 :1963(Part - 1,3,4) RA2011  
IS 2386 Part 1: Particle Size and Shape  
IS 2386 Part 3: Specific gravity, Density, Voids, Water Absorption  
IS 2386 Part 4: Mechanical Properties  
**Date of test** : 02-02-20

#### SIEVE ANALYSIS (PARTICLE SIZE DISTRIBUTION) OF 40MM DOWN COARSE AGGREGATE:

**Total weight taken** : 15000 grams

| Sample No. | Sieve No. | Weight Retained in gms | Cumulative Weight Retained in gms | % Cumulative Weight Retained | % Passing | Required as per IS 383:2016 |
|------------|-----------|------------------------|-----------------------------------|------------------------------|-----------|-----------------------------|
| 1          | 80 mm     | 0                      | 0                                 | 0.0                          | 100       | 100                         |
| 2          | 40 mm     | 247                    | 247                               | 1.6                          | 98.4      | 90-100                      |
| 3          | 20 mm     | 7874                   | 8121                              | 54.1                         | 45.9      | 30-70                       |
| 4          | 10 mm     | 3898                   | 12019                             | 80.1                         | 19.9      | 10-35                       |
| 5          | 4.75 mm   | 2587                   | 14606                             | 97.4                         | 2.6       | 0-5                         |
| 6          | Pan       | 394                    | 15000                             | 100.0                        | 0         | ---                         |

Page 1/2

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### TEST REPORT ON COARSE AGGREGATES

Lab ID : CP-2020-03-03-01

Date: 05-02-20

#### PHYSICAL PROPERTIES

| Sl.no | Tests                          | Result | Requirements as per IS:383-2016                                                              |
|-------|--------------------------------|--------|----------------------------------------------------------------------------------------------|
| 1     | Flakiness Index(%)             | 12.3   | Combined Flakiness & Elongation Index Shall not Exceed 40% for Uncrushed & Crushed Aggregate |
| 2     | Elongation Index(%)            | 11.8   |                                                                                              |
| 3     | Specific Gravity               | 2.64   | —                                                                                            |
| 4     | Bulk Density(Loose) (Kg/l)     | 1.37   | —                                                                                            |
| 5     | Bulk Density(Compacted) (Kg/l) | 1.48   | —                                                                                            |
| 6     | Water Absorption(%)            | 0.26   | —                                                                                            |



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Page 2/2

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### TEST REPORT ON COARSE AGGREGATES

**Lab ID** : CP-2020-03-03-01 **Date:** 04-02-20

**Project Name** : Improvements to Roads and Drains at Doddachanappa Layout,  
Raghuram layout, Kuvempunagara 1st Stage, Valmikinagara in Ward  
No.11 Kuvempunagara.

**Agency** : Executive Engineer, Karnataka Rural Infrastructure Development Ltd,  
#280, 59th Cross Road, 17th 'C' Main Road, 3rd 'Y' Block, Rajajinagara,  
Bangalore-560010

**Customer Reference** : BBMP/EE/BTP/WO/194/2019-20

**Date of Receipt** : 02-02-20

**Sample Type/ Size** : 20mm down size coarse aggregate

**Reference to BIS codes** : IS: 383:2016 (Specification for Coarse and fine Aggregates )  
IS: 2386 :1963(Part - 1,3,4) RA2011  
IS 2386 Part 1: Particle Size and Shape  
IS 2386 Part 3: Specific gravity, Density, Voids, Water Absorption  
IS 2386 Part 4: Mechanical Properties

**Date of test** : 02-02-20

#### SIEVE ANALYSIS (PARTICLE SIZE DISTRIBUTION) OF 20MM DOWN COARSE AGGREGATE:

**Total weight taken** : 5000 grams

| Sample No. | Sieve No. | Weight Retained in gms | Cumulative Weight Retained in gms | % Cumulative Weight Retained | % Passing | Required as per IS 383:2016 |
|------------|-----------|------------------------|-----------------------------------|------------------------------|-----------|-----------------------------|
| 1          | 40 mm     | 0                      | 0                                 | 0                            | 100       | 100                         |
| 2          | 20 mm     | 297                    | 297                               | 5.9                          | 94.1      | 90-100                      |
| 3          | 10 mm     | 2643                   | 2940                              | 58.8                         | 41.2      | 25-55                       |
| 4          | 4.75 mm   | 1812                   | 4752                              | 95.0                         | 5.0       | 0-10                        |
| 5          | Pan       | 248                    | 5000                              | 100                          | 0         | -                           |

Page 1/2



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# 4, 7TH MAIN MALLESWARAM, BANGALORE -3

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### TEST REPORT ON COARSE AGGREGATES

Lab ID

: CP-2020-03-03-01

Date: 04-02-20

#### PHYSICAL PROPERTIES

| Sl.no | Tests                          | Result | Requirements as per IS:383-2016                                                                                                                                                                                                               |
|-------|--------------------------------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | Flakiness Index(%)             | 8.8    | Combined Flakiness & Elongation Index Shall not Exceed 40% for Uncrushed & Crushed Aggregate                                                                                                                                                  |
| 2     | Elongation Index(%)            | 11.3   |                                                                                                                                                                                                                                               |
| 3     | Specific Gravity               | 2.62   | —                                                                                                                                                                                                                                             |
| 4     | Bulk Density(Loose) (Kg/l)     | 1.44   | —                                                                                                                                                                                                                                             |
| 5     | Bulk Density(Compacted) (Kg/l) | 1.49   | —                                                                                                                                                                                                                                             |
| 6     | Water Absorption(%)            | 0.37   | —                                                                                                                                                                                                                                             |
| 7     | Aggregate crushing Value(%)    | 24.6   | Max 30% for Aggregates to be used in concrete for wearing Surface, In case Aggregate Crushing Value Exceeds 30% then the test for ten percent fines should be conducted for Aggregates to be used in concrete other than for wearing Surface. |
| 8     | Aggregate Impact Value(%)      | 25.2   | 30% for Aggregates to be used in concrete for wearing Surface,<br>45% for Aggregates to be used in concrete other than for wearing Surface.                                                                                                   |

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Page 2/2

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## TEST REPORT OF FINE AGGREGATE

**Lab ID** : CP-2020-03-03-01 **Date:** 04-02-20

**Project Name** : Improvements to Roads and Drains at Doddachanappa Layout, Raghuram layout, Kuvempunagara 1st Stage, Valmikinagara in Ward No.11 Kuvempunagara.

**Agency** : Executive Engineer, Karnataka Rural Infrastructure Development Ltd, #280, 59th Cross Road, 17th 'C' Main Road, 3rd 'Y' Block, Rajajinagara, Bangalore-560010

**Customer's Reference** : BBMP/EE/BTP/WO/194/2019-20

**Date of Receipt** : 02-02-20

**Sample Type** : Fine Aggregate

**Reference to BIS codes** : IS 383 : 2016 (Specification for Coarse and fine Aggregates)  
IS: 2386 :1963(Part - 1, 3) RA2012  
IS 2386 Part 1: Particle Size and Shape  
IS 2386 Part 3: Specific gravity, Density, Voids, Water Absorption

**Date of test** : 02-02-20

**Total weight taken** : 1000 grams

| Sl.no | Sieve Size | Weight Retained (gms) | Cumulative Weight Retained (gms) | % Cumulative Weight Retained | % Passing | Requirement as per IS 383:2016 |                 |                  |                 |
|-------|------------|-----------------------|----------------------------------|------------------------------|-----------|--------------------------------|-----------------|------------------|-----------------|
|       |            |                       |                                  |                              |           | Grading Zone I                 | Grading Zone II | Grading Zone III | Grading Zone IV |
| 1     | 10 mm      | 0                     | 0                                | 0.0                          | 100.0     | 100                            | 100             | 100              | 100             |
| 2     | 4.75 mm    | 27                    | 27                               | 2.7                          | 97.3      | 90-100                         | 90-100          | 90-100           | 95-100          |
| 3     | 2.36 mm    | 55                    | 82                               | 8.2                          | 91.8      | 60-95                          | 75-100          | 85-100           | 95-100          |
| 4     | 1.18 mm    | 239                   | 321                              | 32.1                         | 67.9      | 30-70                          | 55-90           | 75-100           | 90-100          |
| 5     | 600 micron | 205                   | 526                              | 52.6                         | 47.4      | 15-34                          | 35-59           | 60-79            | 80-100          |
| 6     | 300 micron | 203                   | 729                              | 72.9                         | 27.1      | 5-20                           | 8-30            | 12-40            | 15-50           |
| 7     | 150 micron | 191                   | 920                              | 92.0                         | 8.0       | 0-10                           | 0-10            | 0-10             | 0-15            |
| 8     | Pan        | 80                    | 1000                             | 100.0                        | 0.0       | ---                            | ---             | ---              | ---             |

**Result :** The tested Sample Conforms to Grading Zone II

Page 1/2



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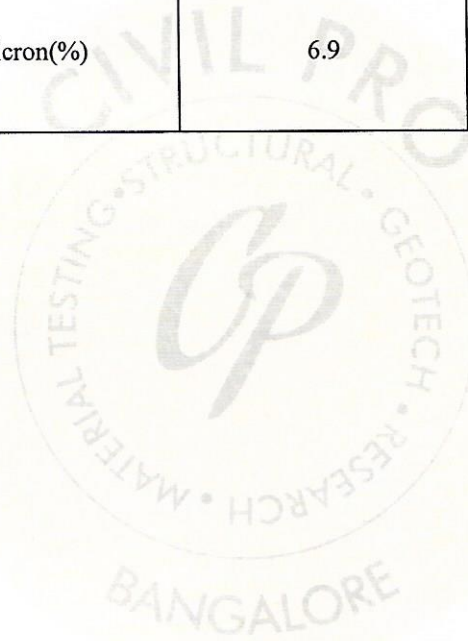
## TEST REPORT OF FINE AGGREGATE

Lab ID : CP-2020-03-03-01

Date: 04-02-20

### PHYSICAL PROPERTIES

| Sl.no | Tests                            | Result | Requirements as per IS 383:2016                                                                                                             |
|-------|----------------------------------|--------|---------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | Water Absorption(%)              | 1.5    | —                                                                                                                                           |
| 2     | Specific Gravity                 | 2.59   | —                                                                                                                                           |
| 3     | Material finer than 75 micron(%) | 6.9    | Uncrushed fine Aggregate Max 3%,<br>Crushed Fine aggregate Max 15%,<br>Mixed Fine aggregate Max 12%,<br>Manufactured Fine aggregate Max 10% |



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Page 2/2

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## TEST REPORT OF PRECAST COVER SLAB

Lab ID : CP-2020-03-03-01 Date: 15-02-20  
Project Name : Improvements to Roads and Drains at Doddachanappa Layout, Raghuram layout, Kuvempunagara 1st Stage, Valmikinagara in Ward No.11 Kuvempunagara.  
Agency : Executive Engineer, Karnataka Rural Infrastructure Development Ltd, #280, 59th Cross Road, 17th 'C' Main Road, 3rd 'Y' Block, Rajajinagara, Bangalore-560010  
Customer's Reference : BBMP/EE/BTP/WO/194/2019-20  
Date of Receipt : 11-02-20  
Sample Type /Size : Precast Cover Slab (100mm)  
Reference to BIS codes : IS: 516 - 1959 Methods of Tests for Strength of Concrete  
Date of test : 11/02/2020

| Sl. No. | Identification Mark | Diameter of the core | Height of the core | Weight of the core | Area    | Failure Load | Core Compressive strength | Corrected Cylinder Compressive strength | Equivalent Cube Compressive strength |
|---------|---------------------|----------------------|--------------------|--------------------|---------|--------------|---------------------------|-----------------------------------------|--------------------------------------|
|         |                     | (mm)                 | (mm)               | (kg)               | (Sq.mm) | (KN)         | (N/mm <sup>2</sup> )      | (N/mm <sup>2</sup> )                    | (N/mm <sup>2</sup> )                 |
| 1       | Cover Slab-1        | 75.51                | 100.48             | 1.116              | 4477    | 80.9         | 18.1                      | 16.8                                    | 21.0                                 |
| 2       | Cover Slab-2        | 75.49                | 100.52             | 1.122              | 4475    | 82.3         | 18.4                      | 17.1                                    | 21.4                                 |
| 3       | Cover Slab-3        | 75.50                | 100.51             | 1.118              | 4476    | 81.5         | 18.2                      | 16.9                                    | 21.2                                 |

Page 1/1  
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## TEST REPORT ON PHYSICAL REQUIREMENTS OF SOLID CONCRETE BLOCKS

**Lab ID** : CP-2020-03-03-01 **Date:** 10-02-20

**Project Name** : Improvements to Roads and Drains at Doddachanappa Layout, Raghuram layout, Kuvempunagara 1st Stage, Valmikinagara in Ward No.11 Kuvempunagara.

**Agency** : Executive Engineer, Karnataka Rural Infrastructure Development Ltd, #280, 59th Cross Road, 17th 'C' Main Road, 3rd 'Y' Block, Rajajinagara, Bangalore-560010

**Customer's Reference** : BBMP/EE/BTP/WO/194/2019-20

**Date of Receipt** : 07-02-20

**Sample Type/Size** : Solid concrete blocks size (400X150X200)mm  
IS : 2185 (Part 1) : 2005(RA 2010) Concrete Masonry Specification

**Reference to BIS codes** : Part 1:Hollow and Solid Concrete Blocks (Dimensions -Annex-B, Clause 9.2 and 10 , Block density Annex -C Clause 9.3 and 10, Compressive strength Annex -D Clause 9.4 and 10, Water absorption Annex -E Clause 9.5 and 10)

**Date of test** : 07-02-20

### BLOCK DENSITY:

| Sl. No. | Measurement of overall Dimensions of Individual Blocks |         |        | Overall Volume of the Block in Cubic Centimetres | Weight of Oven Dried Block in Kilograms to the nearest 10 Gram | Block Density in Kg/cum*10 <sup>6</sup> | Avg.Block Density in (Kg/cum) | As per IS 2185(Part 1) :2005 (RA 2010) |
|---------|--------------------------------------------------------|---------|--------|--------------------------------------------------|----------------------------------------------------------------|-----------------------------------------|-------------------------------|----------------------------------------|
|         | Length                                                 | Breadth | Height |                                                  |                                                                |                                         |                               |                                        |
|         | mm                                                     | mm      | mm     | (Cm <sup>3</sup> )                               | Kg                                                             | Kg/m <sup>3</sup>                       | Kg/m <sup>3</sup>             |                                        |
| 1       | 404                                                    | 151     | 203    | 12384                                            | 33.241                                                         | 2684.2                                  | 2706.2                        | Not less than 1800Kg/m <sup>3</sup>    |
| 2       | 403                                                    | 149     | 199    | 11949                                            | 31.900                                                         | 2669.6                                  |                               |                                        |
| 3       | 400                                                    | 151     | 199    | 12020                                            | 33.233                                                         | 2764.9                                  |                               |                                        |

### WATER ABSORPTION:

| Sl. No. | Wet weight after water absorption | Dry weight (Oven dry) | Water Absorption | Avg.Water Absorption | As per IS 2185(Part 1):2005 (RA 2010) |
|---------|-----------------------------------|-----------------------|------------------|----------------------|---------------------------------------|
|         | kg                                | kg                    | %                | %                    |                                       |
| 1       | 33.91                             | 32.25                 | 4.89             | 4.25                 | Shall not be more than 10% by mass    |
| 2       | 33.57                             | 32.14                 | 4.28             |                      |                                       |
| 3       | 33.44                             | 32.24                 | 3.59             |                      |                                       |

Page 1/3

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Certificate No.: TC-5548

Lab ID : CP-2020-03-03-01

Date: 10-02-20

**DIMENSION ANALYSIS**

| Sl.no            | Length<br>mm | Breadth<br>mm | Height<br>mm | Requirement as per IS<br>2185(Part 1):2005                                                                |
|------------------|--------------|---------------|--------------|-----------------------------------------------------------------------------------------------------------|
| 1                | 399          | 152           | 201          | <b>Length : <math>\pm 5</math>mm<br/>Breadth : <math>\pm 3</math>mm<br/>Height : <math>\pm 3</math>mm</b> |
| 2                | 400          | 153           | 203          |                                                                                                           |
| 3                | 401          | 150           | 202          |                                                                                                           |
| 4                | 401          | 151           | 201          |                                                                                                           |
| 5                | 402          | 152           | 201          |                                                                                                           |
| 6                | 403          | 153           | 199          |                                                                                                           |
| 7                | 403          | 151           | 200          |                                                                                                           |
| 8                | 401          | 153           | 203          |                                                                                                           |
| 9                | 399          | 151           | 200          |                                                                                                           |
| 10               | 400          | 153           | 202          |                                                                                                           |
| 11               | 402          | 153           | 203          |                                                                                                           |
| 12               | 401          | 150           | 200          |                                                                                                           |
| 13               | 403          | 150           | 199          |                                                                                                           |
| 14               | 401          | 151           | 202          |                                                                                                           |
| 15               | 401          | 149           | 200          |                                                                                                           |
| 16               | 400          | 151           | 199          |                                                                                                           |
| 17               | 403          | 149           | 199          |                                                                                                           |
| 18               | 402          | 150           | 200          |                                                                                                           |
| 19               | 401          | 150           | 199          |                                                                                                           |
| 20               | 401          | 150           | 203          |                                                                                                           |
| Average<br>of 20 | 401          | 151           | 201          |                                                                                                           |

Page 2/3

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Certificate No.: TC-5548

Lab ID : CP-2020-03-03-01

Date: 10-02-20

**COMPRESSIVE STRENGTH:**

| Sl. No. | Size of solid block |         | Area               | Failure Load | Compressive strength | Average Compressive strength |
|---------|---------------------|---------|--------------------|--------------|----------------------|------------------------------|
|         | Length              | Breadth |                    |              |                      |                              |
|         | mm                  | mm      | (mm <sup>2</sup> ) | (KN)         | N/mm <sup>2</sup>    | (N/mm <sup>2</sup> )         |
| 1       | 400                 | 152     | 60641              | 286.4        | 4.7                  | 4.7                          |
| 2       | 400                 | 153     | 61173              | 290.9        | 4.8                  |                              |
| 3       | 401                 | 150     | 60154              | 284.5        | 4.7                  |                              |
| 4       | 401                 | 151     | 60411              | 287.7        | 4.8                  |                              |
| 5       | 402                 | 152     | 60972              | 285.4        | 4.7                  |                              |
| 6       | 403                 | 153     | 61654              | 286.7        | 4.6                  |                              |
| 7       | 403                 | 151     | 61004              | 283.2        | 4.6                  |                              |
| 8       | 401                 | 153     | 61358              | 286.8        | 4.7                  |                              |

As per IS Requirements (Table 2, Clause 5.1, 5.2 and 9.4)

| Compressive strength |                        |                           |
|----------------------|------------------------|---------------------------|
| Grade                | Minimum average        | Minimum Individual units. |
| C (5.0)              | 5.00 N/mm <sup>2</sup> | 4.00 N/mm <sup>2</sup>    |
| C (4.0)              | 4.00 N/mm <sup>2</sup> | 3.20 N/mm <sup>2</sup>    |

Page 3/3  
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Certificate No.: TC-5548

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## TEST REPORT OF CEMENT CONCRETE CUBES

**Lab ID** : CP-2020-03-03-01 **Date:** 15/02/2020

**Project Name** : Improvements to Roads and Drains at Doddachanappa Layout, Raghuram layout, Kuvempunagara 1st Stage, Valmikinagara in Ward No.11 Kuvempunagara.

**Agency** : Executive Engineer, Karnataka Rural Infrastructure Development Ltd, #280, 59th Cross Road, 17th 'C' Main Road, 3rd 'Y' Block, Rajajinagara, Bangalore-560010

**Customer's Reference** : BBMP/EE/BTP/WO/194/2019-20

**Date of Receipt** : 10-02-20

**Customer ID** : Vent Bed Concrete

**Sample Type /Size** : 150X150X150 mm

**Sample grade/Age** : M20 / 7 Days Compressive Strength

**Reference to BIS codes** : IS: 516 - 1959 Methods of Tests for Strength of Concrete Cl.5

**Date of test** : 15/02/2020

| Sl. No. | Identification Mark | Grade of concrete | Date of Casting | Date of Testing | Dimension of the Specimen (mm) | Cross sectional area (Sq.mm) | Weight of the sample (kg) | Failure Load (KN) | Compressive strength (N/mm <sup>2</sup> ) | Average Compressive Strength (N/mm <sup>2</sup> ) |
|---------|---------------------|-------------------|-----------------|-----------------|--------------------------------|------------------------------|---------------------------|-------------------|-------------------------------------------|---------------------------------------------------|
| 1       | Vent Bed Concrete   | M20               | 08/02/2020      | 15/02/2020      | 150.44 X<br>151.28 X<br>149.32 | 22758                        | 8.169                     | 417.1             | 18.3                                      | 18.4                                              |
| 2       | Vent Bed Concrete   | M20               | 08/02/2020      | 15/02/2020      | 149.57 X<br>151.03 X<br>151.92 | 22590                        | 8.045                     | 420.0             | 18.6                                      |                                                   |
| 3       | Vent Bed Concrete   | M20               | 08/02/2020      | 15/02/2020      | 149.67 X<br>151.56 X<br>151.24 | 22684                        | 8.825                     | 417.7             | 18.4                                      |                                                   |

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Page 1/1

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**Customer's Reference** : BBMP/EE/BTP/WO/194/2019-20

**Date of Receipt** : 10-02-20

**Customer ID** : Vent Bed Concrete

**Sample Type /Size** : 150X150X150 mm

**Sample grade/Age** : M20 / 28 Days Compressive Strength

**Reference to BIS codes** : IS: 516 - 1959 Methods of Tests for Strength of Concrete Cl.5

**Date of test** : 07/03/2020

| Sl. No. | Identification Mark | Grade of concrete | Date of Casting | Date of Testing | Dimension of the Specimen | Cross sectional area | Weight of the sample | Failure Load | Compressive strength | Average Compressive Strength |
|---------|---------------------|-------------------|-----------------|-----------------|---------------------------|----------------------|----------------------|--------------|----------------------|------------------------------|
|         |                     |                   |                 |                 | (mm)                      | (Sq.mm)              | (kg)                 | (KN)         | (N/mm <sup>2</sup> ) | (N/mm <sup>2</sup> )         |
| 1       | Vent Bed Concrete   | M20               | 08/02/2020      | 07/03/2020      | 150.96 X                  | 22817                | 8.751                | 533.9        | 23.4                 | 23.2                         |
|         |                     |                   |                 |                 | 151.15 X                  |                      |                      |              |                      |                              |
|         |                     |                   |                 |                 | 150.82                    |                      |                      |              |                      |                              |
| 2       | Vent Bed Concrete   | M20               | 08/02/2020      | 07/03/2020      | 151.54 X                  | 22625                | 8.819                | 516.2        | 22.8                 |                              |
|         |                     |                   |                 |                 | 149.30 X                  |                      |                      |              |                      |                              |
|         |                     |                   |                 |                 | 149.90                    |                      |                      |              |                      |                              |
| 3       | Vent Bed Concrete   | M20               | 08/02/2020      | 07/03/2020      | 151.04 X                  | 22846                | 8.939                | 532.4        | 23.3                 |                              |
|         |                     |                   |                 |                 | 151.26 X                  |                      |                      |              |                      |                              |
|         |                     |                   |                 |                 | 149.68                    |                      |                      |              |                      |                              |

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Page 1/1

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Agency : Executive Engineer, Karnataka Rural Infrastructure Development Ltd, #280, 59th Cross Road, 17th 'C' Main Road, 3rd 'Y' Block, Rajajinagara, Bangalore-560010

Customer's Reference : BBMP/EE/BTP/WO/194/2019-20

Date of Receipt : 10-02-20

Customer ID : Vent Bed Concrete

Sample Type /Size : 150X150X150 mm

Sample grade/Age : M20 / 7 Days Compressive Strength

Reference to BIS codes : IS: 516 - 1959 Methods of Tests for Strength of Concrete Cl.5

Date of test : 15/02/2020

| Sl. No. | Identification Mark | Grade of concrete | Date of Casting | Date of Testing | Dimension of the Specimen (mm) | Cross sectional area (Sq.mm) | Weight of the sample (kg) | Failure Load (KN) | Compressive strength (N/mm <sup>2</sup> ) | Average Compressive Strength (N/mm <sup>2</sup> ) |
|---------|---------------------|-------------------|-----------------|-----------------|--------------------------------|------------------------------|---------------------------|-------------------|-------------------------------------------|---------------------------------------------------|
| 1       | Vent Bed Concrete   | M20               | 08/02/2020      | 15/02/2020      | 151.18 X<br>149.89 X<br>150.29 | 22662                        | 8.169                     | 410.3             | 18.1                                      | 18.5                                              |
| 2       | Vent Bed Concrete   | M20               | 08/02/2020      | 15/02/2020      | 150.50 X<br>151.23 X<br>149.52 | 22760                        | 8.045                     | 425.3             | 18.7                                      |                                                   |
| 3       | Vent Bed Concrete   | M20               | 08/02/2020      | 15/02/2020      | 151.04 X<br>151.54 X<br>149.76 | 22888                        | 8.825                     | 429.3             | 18.8                                      |                                                   |

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Page 1/1

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**Customer's Reference** : BBMP/EE/BTP/WO/194/2019-20

**Date of Receipt** : 10-02-20

**Customer ID** : Vent Bed Concrete

**Sample Type /Size** : 150X150X150 mm

**Sample grade/Age** : M20 / 28 Days Compressive Strength

**Reference to BIS codes** : IS: 516 - 1959 Methods of Tests for Strength of Concrete Cl.5

**Date of test** : 07/03/2020

| Sl. No. | Identification Mark | Grade of concrete | Date of Casting | Date of Testing | Dimension of the Specimen (mm) | Cross sectional area (Sq.mm) | Weight of the sample (kg) | Failure Load (KN) | Compressive strength (N/mm <sup>2</sup> ) | Average Compressive Strength (N/mm <sup>2</sup> ) |
|---------|---------------------|-------------------|-----------------|-----------------|--------------------------------|------------------------------|---------------------------|-------------------|-------------------------------------------|---------------------------------------------------|
| 1       | Vent Bed Concrete   | M20               | 08/02/2020      | 07/03/2020      | 150.09 X<br>151.95 X<br>150.49 | 22806                        | 8.751                     | 527.0             | 23.1                                      | 22.9                                              |
| 2       | Vent Bed Concrete   | M20               | 08/02/2020      | 07/03/2020      | 150.58 X<br>150.55 X<br>149.77 | 22670                        | 8.819                     | 504.0             | 22.2                                      |                                                   |
| 3       | Vent Bed Concrete   | M20               | 08/02/2020      | 07/03/2020      | 151.60 X<br>150.09 X<br>150.56 | 22753                        | 8.939                     | 532.9             | 23.4                                      |                                                   |

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Page 1/1  
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Customer's Reference : BBMP/EE/BTP/WO/194/2019-20

Date of Receipt : 10-02-20

Customer ID : Vent Bed Concrete

Sample Type /Size : 150X150X150 mm

Sample grade/Age : M20 / 7 Days Compressive Strength

Reference to BIS codes : IS: 516 - 1959 Methods of Tests for Strength of Concrete Cl.5

Date of test : 15/02/2020

| Sl. No. | Identification Mark | Grade of concrete | Date of Casting | Date of Testing | Dimension of the Specimen (mm) | Cross sectional area (Sq.mm) | Weight of the sample (kg) | Failure Load (KN) | Compressive strength (N/mm <sup>2</sup> ) | Average Compressive Strength (N/mm <sup>2</sup> ) |
|---------|---------------------|-------------------|-----------------|-----------------|--------------------------------|------------------------------|---------------------------|-------------------|-------------------------------------------|---------------------------------------------------|
| 1       | Vent Bed Concrete   | M20               | 08/02/2020      | 15/02/2020      | 150.25 X<br>150.16 X<br>150.84 | 22561                        | 8.169                     | 406.6             | 18.0                                      | 18.2                                              |
| 2       | Vent Bed Concrete   | M20               | 08/02/2020      | 15/02/2020      | 150.05 X<br>149.60 X<br>150.86 | 22447                        | 8.045                     | 411.2             | 18.3                                      |                                                   |
| 3       | Vent Bed Concrete   | M20               | 08/02/2020      | 15/02/2020      | 149.79 X<br>150.98 X<br>150.76 | 22615                        | 8.825                     | 413.6             | 18.3                                      |                                                   |

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Page 1/1  
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**Date of Receipt** : 10-02-20

**Customer ID** : Vent Bed Concrete

**Sample Type /Size** : 150X150X150 mm

**Sample grade/Age** : M20 / 28 Days Compressive Strength

**Reference to BIS codes** : IS: 516 - 1959 Methods of Tests for Strength of Concrete Cl.5

**Date of test** : 07/03/2020

| Sl. No. | Identification Mark | Grade of concrete | Date of Casting | Date of Testing | Dimension of the Specimen (mm) | Cross sectional area (Sq.mm) | Weight of the sample (kg) | Failure Load (KN) | Compressive strength (N/mm <sup>2</sup> ) | Average Compressive Strength (N/mm <sup>2</sup> ) |
|---------|---------------------|-------------------|-----------------|-----------------|--------------------------------|------------------------------|---------------------------|-------------------|-------------------------------------------|---------------------------------------------------|
| 1       | Vent Bed Concrete   | M20               | 08/02/2020      | 07/03/2020      | 151.24 X<br>149.03 X<br>150.80 | 22539                        | 8.751                     | 520.9             | 23.1                                      | 23.2                                              |
| 2       | Vent Bed Concrete   | M20               | 08/02/2020      | 07/03/2020      | 151.84 X<br>149.42 X<br>149.26 | 22689                        | 8.819                     | 512.2             | 22.6                                      |                                                   |
| 3       | Vent Bed Concrete   | M20               | 08/02/2020      | 07/03/2020      | 149.03 X<br>149.69 X<br>150.90 | 22309                        | 8.939                     | 532.5             | 23.9                                      |                                                   |

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Page 1/1

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**Date of Receipt** : 10-02-20

**Customer ID** : Vent Bed Concrete

**Sample Type /Size** : 150X150X150 mm

**Sample grade/Age** : M20 / 7 Days Compressive Strength

**Reference to BIS codes** : IS: 516 - 1959 Methods of Tests for Strength of Concrete Cl.5

**Date of test** : 15/02/2020

| Sl. No. | Identification Mark | Grade of concrete | Date of Casting | Date of Testing | Dimension of the Specimen | Cross sectional area | Weight of the sample | Failure Load | Compressive strength | Average Compressive Strength |
|---------|---------------------|-------------------|-----------------|-----------------|---------------------------|----------------------|----------------------|--------------|----------------------|------------------------------|
|         |                     |                   |                 |                 | (mm)                      | (Sq.mm)              | (kg)                 | (KN)         | (N/mm <sup>2</sup> ) | (N/mm <sup>2</sup> )         |
| 1       | Vent Bed Concrete   | M20               | 08/02/2020      | 15/02/2020      | 149.52 X                  | 22397                | 8.169                | 415.4        | 18.5                 | 18.7                         |
|         |                     |                   |                 |                 | 149.80 X                  |                      |                      |              |                      |                              |
|         |                     |                   |                 |                 | 150.67                    |                      |                      |              |                      |                              |
| 2       | Vent Bed Concrete   | M20               | 08/02/2020      | 15/02/2020      | 151.37 X                  | 22641                | 8.045                | 427.7        | 18.9                 |                              |
|         |                     |                   |                 |                 | 149.57 X                  |                      |                      |              |                      |                              |
|         |                     |                   |                 |                 | 151.53                    |                      |                      |              |                      |                              |
| 3       | Vent Bed Concrete   | M20               | 08/02/2020      | 15/02/2020      | 151.77 X                  | 22894                | 8.825                | 427.9        | 18.7                 |                              |
|         |                     |                   |                 |                 | 150.85 X                  |                      |                      |              |                      |                              |
|         |                     |                   |                 |                 | 151.79                    |                      |                      |              |                      |                              |

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Page 1/1

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